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AGRICULTURE.

Administration Report of the Director of Agriculture for the year 1944.

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REPORT OF THE DEPARTMENT OF AGRICULTURE FOR THE YEAR 1944.

CONTENTS.

	Page
AGRICULTURAL POLICY	1
PART I—AGRICULTURE IN 1944.	
General Conditions	1
Agricultural Products for Home Consumption.	
Food Production	1
Livestock	1
Agricultural Exports in 1944.	
Sugar	2–3
Cacao	3
Citrus	3
Coconuts	4
Minor Crops	4
PART II—DEPARTMENTAL INSTITUTIONS, DISTRICT WORK, EXPERIMENTAL WORK AND SPECIALISTS' REPORTS.	
Departmental Institutions.	
Staff	4
River Estate	4
Demonstration Plot at La Pastora...	5
Royal Botanic Gardens and Government Grounds	5
St. Augustine Nursery	5–6
St. Augustine Experiment Station	6
Government Stock Farm and Animal Husbandry	6–8
District Work.	
Duties of District Staff	8
Land Settlements	8
Agricultural Credit Societies	8
Agricultural Co-operative Societies	8
Experimental Work.	
Sugar Agronomy	8–9
Cacao Agronomy	9–10
Citrus Agronomy	10
Miscellaneous Crop Investigations	10–11
Specialist Reports.	
Plant Pathology	11–12
Entomology	12–13
Soil Survey	13–14
Veterinary	14–15
Imperial College of Tropical Agriculture	15
Publications	15
Legislation.	
Agriculture	16
Veterinary	16

AGRICULTURE.

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AGRICULTURAL POLICY.

In the estimates for 1945 financial provision has been made for implementing some of the recommendations of the Agricultural Policy Committee, notably in the provision of increased numbers of livestock and in the acquisition of a number of mixed farming and cacao demonstration centres. Proposals are under consideration by Government for the formation of Statutory Crop Boards which it is hoped will create a closer link between Government and producers than has hitherto been the case. A site has been selected for the Farm Institute, a plan of the building prepared and the funds voted.

I.—AGRICULTURE IN 1944.

General Conditions.

2. The weather throughout the year was favourable for most crops. The abundant rains of 1943 were followed by a short dry spell in the early months of 1944 and the remainder of the year was characterised by intermittent rains without any appreciable dry spell. Towards the end of the year rains did interfere a little with the harvesting of the rice crop. The rainfall at St. Clair was 67.78 inches as compared with 68.41 inches for the previous year. The average rainfall for a period of 83 years was 63.43 inches. The rainfall recorded for representative localities of the Colony was as follows:—Port-of-Spain 67.78 inches; Diego Martin, River Estate 80.81 inches; St. Joseph, Government Farm 72.12 inches; Couva, Esperanza Estate 59.15 inches; Waterloo, Carapichaima 70.97 inches; Rio Claro, Police Station 96.42 inches; Siparia, Police Station 71.56 inches; Naparima, Usine Ste. Madeleine 64.69 inches; Cedros, Perseverance Estate 64.03 inches; Sangre Grande, Grovesnor Estate 82.19 inches; Toco, Police Station 94.58 inches; Tobago, Botanic Station 90.47 inches.

3. The extreme shortage of agricultural labour reported in 1943 was not as acute during 1944, nevertheless the labour situation still remained difficult in the sugar and cacao industries.

4. Appreciable damage was done by squirrels, rats and yellow-tail birds to cacao, coffee and corn crops owing to a scarcity in the supply of shot gun cartridges.

Agricultural Products for Home Consumption.

Food Production.

5. There was a very substantial all-round increase in food crop production in 1944. A survey disclosed that at the height of the season there were 54,000 acres under annual food crops, and there were in addition plantain and banana stems equivalent to over 7,000 acres if planted as pure stands. *This was equivalent to more than 2½ times the estimated prewar acreage.* The total production of these food crops was estimated to be about 150,000 short tons, the wholesale value of which was over $9,000,000.

6. *The rice crop was far larger than in any previous year,* the area in swamp and hill rice being 15,000 acres and 4,000 acres respectively. The corn crop also was a heavy one, the combined acreage of the early and late crops being over 16,000 acres. Some 20,000 acres were devoted to ground provisions of various kinds, 4,000 acres to pulse crops and 4,000 acres to commercial vegetable production.

7. *An outstanding feature* was the exceptionally large production and consumption of green vegetables. Record crops of cabbages, tomatoes and cauliflower were produced while lettuce and water cress were available in large quantities throughout the year.

8. A free issue of Black-Eyed peas for planting in the lagoon areas, where the 1943 floods had ruined the crop, together with a planting subsidy of $5.00 per acre resulted in a larger acreage than normal being planted in 1944 and the whole crop was successfully harvested. Yields on the whole were satisfactory.

9. The irrigation area in Bejucal received water from the Caroni River for the first time in 1944 and rice growers who now see an assured water supply are being encouraged to grow vegetables in the dry season between rice crops. Schemes are being completed to provide modern villages outside the irrigation area for those persons who now live inside the area. This will give the rice growers better living conditions and release more land for rice growing. Schemes are also being prepared to make an early start on the development of the Nariva Swamp which will provide land and work in the post-war period for the intensive development of small scale agriculture.

Livestock.

10. *Improvement and Development of Livestock.*—The development of the Government Stock Farm, Trinidad, has made a large number of livestock available for the improvement of farm animals and provision has been made in 1945 to expand the Tobago Stock Farm.

11. Breeding units which include a pure-bred bull, Kentucky jack donkey, boar and buck goat regularly stand for service in many outlying districts. Individual sires, including Murrah Water Buffaloes, where necessary, also stand for service.

12. *Water Buffalo.*—The Sugar Estates continue to breed a large number of Water Buffaloes for draught purposes and a number of these animals were sold to peasants during the year. The numbers of working and dairy cattle have not decreased.

13. *Horsekind—Equines.*—There is a shortage and a good demand for horses, mules and donkeys especially in St. Patrick and Victoria where 314 animals died following the outbreak of Equine Encephalomyelitis. It has been impossible to replace them as the main source of supply (Venezuela) is no longer available due to the loss of a large number of equines in that country from the same disease and the restrictions placed on the export of the animals.

14. Government undertook the importation of two small shipments of donkeys from the Leeward Islands to relieve the situation, but importation from that source was discontinued as the donkeys were of a very small type and unsuitable for draught work.

15. *Goats.*—Great interest continues to be taken in goat husbandry and the Trinidad Goat Society's Exhibition on the Queen's Park Savannah early in the year gave excellent evidence of the improvement of the dairy goat in the Colony. Photographs of this show appeared in a well-known English periodical in September. In the month of December four British Alpine (Didgemere strain) and two Anglo-Nubian (Malpas strain) bucks arrived from the United Kingdom for the Department of Agriculture to continue the good work of improving the dairy qualities of the local goat.

16. *Pigs.*—The importation of gilts and sows from Tobago for breeding purposes had to be discontinued during the last six months of 1944 due to an outbreak of Swine Fever in that island. It is hoped that importation will be resumed once again early in 1945 as the incidence of the disease has declined.

17. *Poultry.*—Poultry keeping has continued to be on the increase as part of the Grow More Food campaign, and the breeding pens of the Stock Farm have been increased to 33 which will make available a larger number of pure-bred eggs and chicks to the public during the year.

18. *Feeding of Livestock.*—The feeding of the livestock in the Colony has been more satisfactory during the year as there has been a good supply of bulky food due to the heavy rainfall and a decided improvement in the supply of concentrates. A liberal supply of grain and meals was made available to the large Sugar Estates and cane farmers by the Food Controller during the crop season, Balanced rations for dairy cows and goats prepared at the Government Stock Farm, St. Joseph. were sold by the Food Controller through his Marketing Depots throughout the year and the supply of poultry feeds, both mashes and scratch grains, was good.

19. In co-operation with Dr. E. Phillis, Physiologist of the Empire Cotton Growing Corporation, attention has been given to the use of waste rum-vat yeast as a supplementary food for livestock, and some preliminary trials of yeast supplement on poultry and pigs carried out under the direction of the Officer-in-Charge, Government Farm, St. Joseph, have given encouraging results. This work has been made possible through the interest and co-operation of the Managers and Staffs of the Ste. Madeleine Sugar Co., Ltd., and Caroni, Ltd. Funds were provided to enable the Plant Pathologist of the Department of Agriculture to make enquiries in Canada and in the United States with regard to the recovery and use of waste yeast, so that recommendations could be made to Government and advice given to interested persons in Trinidad. Studies on the recovery and use of this by-product yeast are being continued.

20. *Juvenile Farm Clubs.*—The Juvenile Farm Club movement in Trinidad suffered a little during the year due to transport difficulties for the inspecting staff, but arrangements were made to overcome this towards the close of the year. The movement in Tobago continues to expand and there are now 137 clubs in Trinidad and 37 in Tobago. Prizes amounting to $2,240 were given by Government for the Clubs' Exhibitions throughout the Colony.

21. *Livestock Shows.*—The Seven Annual Cane Farmers' and Peasants' Livestock Shows in the cane farming areas of the Colony were again held and there was a noted improvement not only in the animals exhibited but in the layout and administration of the shows.

22. *Training of Personnel.*—During the year personnel to be trained in practical animal husbandry were sent to the Government Stock Farm, St. Joseph, from the Leeward and Windward Islands at the request of the Comptroller for Development and Welfare, and breeding stock, chiefly sires have been shipped from the Colony to the Leeward and Windward Islands, the French West Indian Islands, Dutch Guiana and Venezuela.

Agricultural Exports in 1944.

23. There was a slight improvement in the agricultural exports of the Colony during 1944, the total value being $7,892,910 as compared with $6,124,522 in the previous year. Notable decreases are observed in exports of sugar, citrate of lime, tonca beans and hides, while substantial increases are observed in exports of rum, raw cocoa, canned grapefruit juice, raw rubber and copra.

24. The details of exports are given below:—

		Quantity.	*Value.*	*Value.*
			$	$
Sugar and Bye-Products.				
Sugar	tons	55,399	4,104,233	
Molasses	gals.	8	4	
Rum	liq. gals.	439,615	679,572	4,783,809
Cocoa.				
Raw Cocoa	lb.	10,622,633	1,411,796	
Cocoa Butter	lb.	17,334	5,385	
Prepared Cocoa	lb.	7,922	2,673	1,419,854
Citrus.				
Lime Oil—Distilled	lb.	32,870	234,626	
Lime Oil—Hand pressed	lb.	350	3,000	
Raw Lime Juice	gals.	61,022	38,888	
Limes—fresh	lb.	29,557	1,503	
Citrate of Lime	lb.	19,548	2,266	
Fresh Grapefruit	No.	156,419	5,500	
Fresh Oranges	No.	219,037	10,683	
Canned Grapefruit Juice	gals.	244,898	219,228	515,694
Tonca Beans	lb.	105,797	87,513	87,513
Rubber—Raw	tons	190	271,191	271,191
Coffee.				
Raw Coffee	lb.	59,203	12,036	
Prepared Coffee	lb.	32,942	10,707	22,743
Coconuts and Coconut Products.				
Copra	lb.	2,240,000	243,250	
Edible Oil	gals.	79,839	9,301	252,551
Peas and Beans	lb.	50	8	8
Livestock and Hides.				
Livestock	—	...	2,588	...
Hides	lb.	285,283	13,697	16,285
Bitters	proof gals.	51,142	441,641	441,641
Honey	lb.	980	157	157
Miscellaneous	—	...	81,464	81,464
Total Value of Exports		...	...	$7,892,910

Sugar.

25. *Production.*—The sugar crop closed with a total of 74,262 tons as compared with 70,975 for the previous year. The total tonnage of canes ground was 688,833; estates supplied 460,586 and farmers 228,247. Although there was some improvement in labour supply factories were not able to work continuously during the grinding season. Unreaped canes amounted to approximately 100,000 tons of which farmers canes were estimated to be only 2 per cent., and the remainder estate canes.

26. *Price of Canes and Planting Subsidy.*—The price paid for canes was $5.50 per ton.

27. During the year a total of approximately $204,050 was paid out in subsidies at the rate of $40 per acre for canes planted between 1st July and 15th November, 1943. Of this amount approximately $78,823 was paid to farmers and $125,227 to estates.

28. A planting subsidy at the rate of $40 per acre was again paid in 1944 from Imperial Government funds, the planting period being divided into the dry weather period January-May and the wet weather period June-December. The earlier planted portion, which will probably be reaped in 1945, comprised 1,628 acres of farmers' crop plants and 960 acres planted by estates. On these areas instalments at the rate of $30.00 per acre have been paid, the final payment of $10.00 will be made in February, 1945.

29. Reports of inspectors indicate that very much more cane has been planted for the wet season subsidy of 1944 than was planted during the wet season of 1943, evidence that the cane cultivators are now seriously endeavouring to replant their lands with the assistance of the subsidy.

30. *Field Experiments.*—The investigational work of the Sugar Agronomist continues to be concerned, in the main, with the field investigations on manurial, cultural and varietal problems and continues to give information of value to the sugar industry. The cane variety B.34104, which was recommended a few years ago, is now the most commonly planted variety and a survey of fields reaped during the last crop has shown that it has, on the average, given the best yield per acre throughout the sugar areas. Three other varieties B.3337, B.37161 and B.37172 are being extended and show promise of becoming standard varieties on certain soil types.

31. In view of the inadequate labour supply, systems of cultivation involving increased mechanisation of the industry are being tried out on an estate scale.

Cacao.

32. Budded plants of trees growing in the Amazon Valley with evidence of extremely high resistance to Witches' Broom were released from the Plant Quarantine Station and established at River Estate. Growth has been satisfactory and although an occasional broom has been recorded on the young plants the number is negligible in comparison with the infection on local trees and seedlings growing alongside. Trials to test the degree of resistance of each of the 32 clones will begin in 1945.

33. Since the report of the Committee appointed to enquire into the needs of the cacao industry (Council Paper No. 61 of 1940), the cacao situation changed considerably and it became necessary for the Cocoa Board, with the approval of the Governor in Council, to review the situation in May, 1944, and adopt certain variations of the scheme. The areas suitable for cacao cultivation will be provided with high yielding varieties propagated by cuttings. Where the incidence of Witches' Broom disease is heavy, replanting will be done with selections of the more resistant cacao varieties.

34. The cacao propagating station at La Pastora produced 50,000 rooted cuttings during the year. Most of these were used for extending the nurseries from which cuttings are taken, and also for the establishment of cacao demonstration plots in the principal cacao districts.

35. Trials of selected high yielding varieties propagated from cuttings have continued to give satisfactory results at River Estate.

36. A fair number of seedling selections from local trees and introductions from South America continues to show marked resistance to Witches' Broom disease. These are being propagated vegetatively at Marper Estate and will be further tested for resistance to Witches' Broom disease and also for yielding capacity.

37. Cuttings from the local selections have continued to give every indication that the yields expected of them will be more than realised. A fair number of 7 year old trees of ICS.1 on our best cacao soil gave crop at the rate of 9 bags per acre for the 1943-1944 year and on a much poorer soil the same variety yielded at the rate of 3½ bags per acre at the age of 5 years which is much better than normal yields. The members of the extension Services, sponsored by the Agricultural Society and prominent planters have lectured in many localities of the Colony to explain the Cacao Rehabilitation Scheme to small proprietors and excursions to Marper Estate, Non Pareil, River Estate and the Propagating Station have done much to foment a spark of optimism in many of the cacao cultivators who are now availing themselves of the assistance which Government is offering for the replanting of suitable lands.

38. The presence of a virus disease in Trinidad cacao was demonstrated by Mr. A. F. Posnette of the Gold Coast Department of Agriculture, who was making cacao selections here on behalf of the Government of that Colony.

39. A search has been made throughout the cacao areas of Trinidad and Tobago, as a result of which the virus disease was found to be restricted to the north-western part of Trinidad, where it does not seem to be of economic importance. Investigations into various aspects of the disease are being undertaken, through the collaboration of the Mycologist at the Imperial College of Tropical Agriculture and the Plant Pathologist of the Department of Agriculture.

Citrus.

40. As anticipated the crop was smaller than during the previous year and, considering the present situation, the price declared by the Co-operative Citrus Growers' Association was reasonably good. The bulk of the crop was processed and sold in the form of canned juice.

41. Limes continued to die from root disease and as a result of this, together with transportation difficulties, the crop harvested was smaller than for previous years. Some estates installed juicing plants and this assisted in overcoming transport difficulties.

Coconuts.

42. The good rains in 1943 and in the early part of 1944 appear to have had a noticeable effect on the yield and size of nuts during 1944. Labour is slowly drifting back to the coconut estates but it is regretted that several millions of nuts which ripened in 1943 could not be collected before they were spoilt by germinating. The present good crops have given the best coconut areas a fair return at the price of $4.75 per 100 lb. copra.

Minor Crops.

Rubber.

43. The year 1944 saw a considerable increase in the amount of rubber won, helped to some extent by more efficient method of tapping the Castilloa trees. This method consists in climbing the tree, making a V-shaped longitudinal incision down the trunk and main branches and leading into the channel so formed the latex obtained by tapping a series of lateral incisions 3 feet apart on both sides of the main channel to form a herring-bone pattern down the trunk. These lateral V incisions are deepened by a final cut with a sharp pointed knife and a space of some 4 inches is left uncut to prevent ringbarking the tree. A special knife is used. Many more small proprietors who own less than 100 scattered trees have settled down to win rubber from them encouraged by the present very remunerative price. The budwood introduced from high yielding clones has been established at the St. Augustine Nurseries, and on several estates plots have been planted with seedling stocks to receive the first issue of buds for multiplication purposes in 1945.

Tonca Beans.

44. The tonca bean industry remained very inactive during the year. The crop in all districts was very poor and were it not for the younger trees which had been planted during the 1930-1940 period the Colony's crop would have been negligible. This is to be anticipated since tonca beans are relegated usually to soils and conditions only suitable for forest regeneration. No cultural work is done and no manuring attempted.

45. The market in New York was very slow-moving on account of the War situation and withdrawals from stocks held were not brisk. The price paid in Trinidad averaged 70c. per lb., which was low compared with pre-war prices.

46. The export of planting material was prohibited by Proclamation No. 45 of 1944. Importations of beans for curing and re-export are subject to a certificate issued by the Director of Agriculture.

Bananas.

47. The high market price of bananas has led to considerable planting of the Gros Michel variety in cacao fields heavily infected with Witches' Broom disease and under the shade of the immortelle trees they have not suffered badly from *Cercospora* leaf spot disease.

Coffee.

48. The coffee crop in the Southern Counties exceeded all expectations and although very remunerative prices were offered to harvest the crop much remained unpicked at the close of the dry season. Consequently the price of 18-20c. per lb. at the beginning of the year fell to about 10c. before the end of the year.

II.—DEPARTMENTAL INSTITUTIONS, DISTRICT WORK, EXPERIMENTAL WORK AND SPECIALISTS' REPORTS.

Departmental Institutions.

Staff.

49. The severe shortage of staff in the administrative and technical branches of the Department reported in the Annual Report for 1943, continued to the end of the year.

50. Mr. R. O. Williams, Deputy Director of Agriculture who had acted as Director for almost four years, left the Colony on the 29th October, 1944, on transfer as Director of Agriculture, Zanzibar and Captain H. V. M. Metivier was appointed to act as Director.

51. Mr. J. C. Muir, Director of Agriculture, arrived in the Colony on the 31st December.

52. Dr. F. J. Pound was appointed Senior Agricultural Officer during the year, Dr. B. G. Montserin was appointed to act as Cacao Agronomist and Messrs. M. N. Lucie-Smith and E. G. Benson were appointed Agricultural Officers. The District Extension Services are still below strength, and investigation and advisory work suffered to some extent from the administration of planting subsidies for sugar cane and black-eye peas and the inspection of plots for replanting under the Cacao Rehabilitation Scheme.

53. I wish to record my grateful acknowledgment of the unstinted help and support given by all members of the staff in their endeavour to maintain the Department's activities under trying circumstances.

River Estate.

54. Dr. F. J. Pound reports that the work at River Estate during the year 1944 was confined largely to food crop production in the area around the cacao experiments where the old and heavily diseased trees were being cleared. The Cacao Research Staff of the Imperial College of Tropical Agriculture maintained the experiments in Field 7 until the latter part of the year when the estate was in a position to provide labour as previously had been done.

55. Dr. Montserin assumed the duties of Cacao Agronomist on July 1st and took in hand the few remaining cacao experiments on River Estate outside the area of the Imperial College of Tropical Agriculture.

56. Before the end of the year a plan was drawn up for the preliminary layout of the plots on the demonstration mixed farming station, pigsties were erected and sows purchased. Some twenty rabbits were also purchased and housed in a special model rabbitry. Plans were made to have the breeding unit brought up to strength on the 1st January, 1945.

57. *Food Production.*—Attention was mainly concentrated upon the production of food for human consumption and for livestock. Corn, hill-rice, plantains, bananas, yams and cucumbers were grown and sold locally.

58. *Tonca Beans.*—The tonca bean crop was poor, this being the general experience of most districts in the island.

59. *Rubber.*—Hevea rubber trees on the estate yielded 1,074 lb. raw rubber which were sold for 73c. per lb. average.

60. *Citrus.*—The citrus crop was fair considering the lack of cultivation which the fields received during preceding years. The crop was disposed of locally and realised $1,434.

61. *Cacao.*—The cacao crop was considerably reduced on account of the cutting out of many fields and the ravages of pests and Witches' Broom disease. Only 108½ bags of 165 lb. were reaped.

62. *Timber.*—A number of cedar and mahogany trees were felled and sold and several were sawn for providing material for repairs and construction on the estate. Revenue from this source amounted to $2,000. The total revenue for the year amounted to $14,282 and expenditure was $21,607.45.

Demonstration Plot at La Pastora.

63. In June, 1943 one of the ordinary Land Settlement Plots at La Pastora was converted into a demonstration plot. Some of the criticisms levelled at the settlers is that they have little idea of how to lay out their plots, what crops are most appropriate to grow and the lack of animals to provide manure. So it was with the idea of showing the settlers what could be done that we laid down a demonstration plot in the centre of La Pastora.

64. A family comprising a husband, wife and one young daughter was put to live in the house and this family was to carry out all the work on the plot with the aid of such casual labour as was considered necessary. The plot was cleared, measured and planned before any crops were planted.

65. On both sides of the main entrance path, plots were relegated to the growing of exotic vegetables such as tomatoes, cabbage, cauliflowers, melongenes, carrots, patchoi, kohl rabi, cucumbers, peppers, lettuce, ochroes, beans and onions which would rotate among themselves. A floral hedge, two small pieces of lawn and flower borders were planted in front of the house.

66. The remainder was divided into large plots of about ¼ acre each by boundary hedges and by dividing hedge rows of fruit trees, a long line of citrus trees flanking either side of the house and mangoes, &c. at right angles in two lines.

67. Two of the compartments thus formed were graded and cleared of tree trunks and planted in tannias, eddoes, dasheen and sweet potatoes.

68. Small stock comprising a goat, pig, rabbits and poultry were also provided and suitable pens were constructed.

69. The revenue of the station amounted to $739.45 and expenditure to $3,127.02. The expenditure included $1,065 in stock buildings and the purchase of livestock and included also the expenditure in planting certain crops such as yams which had not been reaped at the close of the year. In addition approximately $400 was spent on clearing logs, levelling and grading the site which would enable work to be carried on in an orderly fashion in 1945.

Royal Botanic Gardens and Government Grounds.

70. *Maintenance.*—The Acting Curator, Mr. R. E. Dean, reports that the Royal Botanic Gardens and the grounds around Government Buildings in Port-of-Spain under the control of this Department were regularly maintained.

71. *Food Production.*—The demonstration vegetable garden in the Sunken Garden, Queen's Park Savannah, again afforded excellent opportunities for practical demonstration. Under the auspices of the Horticultural Club a public Grow More Food Rally was held in April and was timed as a prelude to the planting season. A number of exhibits was staged by the Local Production Department, Food Control, the Government Farm and Royal Botanic Gardens of the Department of Agriculture, and several local firms displayed garden equipment and appliances. A public address system was installed by the Horticultural Club.

72. The Demonstration Food Garden at the Head Office Grounds, St. Clair, was again devoted to the cultivation of the heavy root crops which could not be conveniently grown in the Queen's Park Savannah Garden.

73.—*Rubber Production.*—In January, 1944, 84 Hevea trees were tapped on alternate days and tapping was discontinued during the dry months of February to April. In May 60 trees only were tapped every third day to the end of the year. This alteration of method was introduced after obvious ill effects of continuous tapping throughout 1943 had become evident. The total amount of smoked biscuit and scrap rubber produced and sold to the official purchasing agent of the Rubber Development Corporation to the close of the year was 440 lb. realising $299. A practical demonstration of the modern system of Castilloa and Hevea tapping was given to school teachers taking the special course in agriculture.

Development Planting Schemes.

74. A new hedge of *Murraya exotica* has been planted to enclose the quarters of the Colonial Secretary; levelling of the lawn, returfing and renovation of the flower beds were also undertaken.

75. A hedge of *Malvaviscus* was planted on the western boundary of the St. James Police Station.

St. Augustine Nursery.

76. The Manager, Mr. R. E. Dean, reports that 6,853 orange plants, 1,158 grapefruit, 7,761 limes, 2,266 budded avocadoes and 1,577 grafted mangoes were distributed.

77. The production of vegetable seedlings was continued, 6,986 boxes being distributed.

78. *Hevea Rubber.*—Further shipments of budwood of certain Oriental high yielding clones, and several new introductions of high yielding disease resistant Ford-Brazil selections were received from Costa Rica through the agency of the Bureau of Plant Industry, Washington, D.C., U.S.A. A total of 380 budded plants has now been established for multiplication purposes.

79. *Derris.*—Multiplication of the two high yielding rotenone clones of Derris was continued throughout the year. Two blocks, one-third of an acre each, have now been established in these types.

80. Revenue of the station was $8,740.19 and expenditure was $23,778.58.

St. Augustine Experiment Station.

81. *Citrus Crop.*—About 6,317 crates of Marsh and 282 crates of Foster Grapefruit and 112 crates of oranges were delivered to the Co-operative Citrus Growers' Association and 801 crates of grapefruit and 143 crates of oranges otherwise disposed of. Revenue from the citrus crop amounted to $6,676.51.

82. *Sugar Cane.*—Varieties released for trial under estate conditions included B.40100, B.40102, B.40105, B.40112, B.40116, B.40117 and Yellow Caledonia. Twelve varieties were released from the Plant Quarantine Station from July to November:—B.41211, B.41226, B.41227, B.41228, B.41238 and B.41261. Multiplication of these varieties was carried out by the single-eyed cutting system. Altogether 1,119 cuttings were supplied during the year.

83. Revenue of the station amounted to $8,590.57 and expenditure $15,720.56.

Government Stock Farm and Animal Husbandry.

84. Mr. A. P. McWilliam, Agricultural Officer in charge of the Government Stock Farm, reports as follows:—The expansion scheme at the Farm could not be completed during the year due to shortage of staff in the Public Works Department.

85. Nine calf boxes were erected during the year and 10 new poultry runs were constructed.

Cattle.

86. *Holstein-Friesians.*—The Carnation Bull "Sir Inka May 45th" imported in 1935 died during the year. His son "Inka Leta May" has taken his place at the Farm. This bull has two other pure-bred sons now standing at the breeding station at Mucurapo.

87. The pure-bred Holstein bull "Island King Korndyke" was loaned to Waterloo Estate in exchange for a young pure-bred Holstein bull locally bred.

88. Seventeen bull calves were sold to the peasantry during the year. They were out of good cows and will serve a useful purpose in country districts later on.

89. Cows and heifers were bred at the Stock Farm, Mucurapo and River Estate during the year as follows:—

Government Stock Farm.		
To pure-bred bulls	... ...	270
grade bulls	... ...	122
Mucurapo Station.		
To pure-bred bulls	... ...	319
grade bulls	... ...	120
River Estate.		
To pure-bred bulls	... ...	62
grade bulls	... ...	—

90. *Zebu Cattle.*—Zebu cattle were again maintained in three sections as in previous years, viz.: the large herd of pure-bred foundation stock, the dairy herd and cows selected for grade dairy cattle breeding.

91. During the year 5 young Zebu bulls, 2 young cows and 3 heifers were sold from the herd and shipped to Venezuela, Dutch Guiana and Martinique.

92. *Sahiwal or Montgomery Cattle.*—There was no outstanding improvement in the milk records of these cows: the best daily yield was 28 lb. and the highest yield for a lactation period 3,276 lb. in 263 days.

93. Bulls of this breed stood for service at the Farm, Usine Ste. Madeleine, Trinidad Dairies, Ltd., Jerningham Junction, Paradise Pasture, Tacarigua and Tobago. Two young bulls were sent to the Tobago Farm towards the end of the year.

94. The strength of the Sahiwals on the Farm at the end of the year was 7 bulls, 10 cows, 5 heifers and 1 bull calf.

95. *Murrah Water Buffaloes.*—There were 4 Water Buffalo Bulls available for service: 2 imported from India and 2 locally bred. Full use was made of these bulls by many of the Sugar and Coconut Estates in the Colony during the year. The strength of this herd at the end of the year was 5 bulls, 2 bull calves, 5 cows and 1 heifer.

96. *Milk Yield.*—The dairy herd produced 43,182 gallons of milk and 40,871 gallons were supplied to public institutions. The milk yield of each cow was recorded daily and butter fat tests were made periodically.

97. *Milk Scheme for School Children.*—This was again continued and the Farm also undertook the distribution of a mid-day meal for the children in the San Juan area. 9,062 gallons of milk were distributed under the scheme, the bulk of which was purchased from the peasantry. It is hoped that in the coming year it will be possible to extend the scheme to Arima as originally planned.

98. *Health of Herds.*—One hundred and sixty-four cows calved normally during the year and 6 aborted. Strict preventive measures were again adopted in controlling this condition.

99. Regular monthly dosing of calves with copper sulphate was again carried out with satisfactory results in controlling parasitic infestation and Phenozine (a proprietary brand of Phenothiazine) was also used in certain cases.

Horsekind.

100. *Thoroughbred Stallions.*—"Bachelor's Tut" (1925) and "Young Native" (1929) stood for service at the Farm throughout the season. They were assisted by the stallions "Homoa" (1937) and "Rose Garland" (1938) which were stabled at the Farm pending shipment to Antigua and Dominica, respectively, by which Colonies they were purchased.

101. "Flotsam" (1934) was stationed at the Farm, Tobago, for the entire season and was returned to Trinidad at the end of the year. "Young Native" was sent over to Tobago at the same time for the 1945 season. During his stay in Trinidad "Young Native" stood at Woodford Lodge Estate where he was bred to a number of mares.

102. *Jack Donkey Stallions.*—The pure-bred Jack Donkey stallions "Tom Adams", "Kentucky", "Jackie", "Trinidad Joe II" and "Penn" were all used in breeding units. The imported Jack Donkey stallions "Sultan" and "Trinidad Joe" remained at the Farm throughout the year. The old imported Jack Donkey "Emperor II" died early in the year. Services jacks to mares amounted to 43 and jacks to jennies 68.

Pigs.

103. No outside sows were again allowed on the Farm for service due to Swine Fever in the Colony. Arrangements were, however, made to station boars at San Juan and Arouca so that pig breeding in the County of St. George should not be interrupted.

104. The herd at the Farm was divided into two and some of the pigs, both Large Blacks and Berkshires, were transferred to the "Evacuation Camp" adjoining the St. Augustine Nurseries.

105. A number of young boars is being reared for breeding work in out districts and a number of sows are reserved both to increase the number of stock at the Farm and to replace the stock at the Tobago Farm which had to be destroyed owing to Swine Fever.

Goats.

106. Four British Alpine (Didgemere Strain) and two Anglo-Nubian (Malpas Strain) bucks arrived from England for the Stock Farm at the end of December. One of the British Alpine bucks was suffering from pneumonia on arrival, but the others although not in the best condition due to the long sea voyage were fairly healthy.

107. Breeders of dairy goats made full use of the British Alpine bucks at the Farm as well as those stationed in breeding units and with private individuals and it is encouraging to see the number and quality of dairy goats that are now brought for service at the Farm and at out stations. The number of does bred at the Farm was 288 and at Mucurapo Pasture where two bucks are maintained permanently the number of services recorded was 165.

Poultry.

108. The breeding pens were increased to 33; 16 Rhode Island Reds, 10 White Leghorns, 4 Barred Plymouth Rocks and 3 New Hampshires. An early start was made as the moulting season was over sooner than usual.

109. A total of 11,048 eggs were laid during the year. These were mostly used for hatching to meet the demand for week old chicks. A total of 1,444 chicks were sold during the year and 1,000 eggs for hatching. Six hundred and sixty chicks were kept for the Farm stock from this amount to increase the number of breeding pens in the 1945-46 season.

110. The fertility of the eggs for the season October-December was quite good, an average of 75 per cent. being obtained for all breeds. Three pens of poultry were sent to the Imperial College of Tropical Agriculture for providing practical demonstration in poultry husbandry for the students.

Rabbits.

111. Of the Rex rabbits imported from England in 1943, the Havana is proving to be a more satisfactory type for conditions here. The Chinchillas lose their colour and develop sore feet. One Havana buck and 3 does were sold to the Department of Agriculture, British Guiana.

112. The local type does bred to the Havana and Chinchilla bucks provided a good meat type rabbit and all cross-breds showing typical Rex rabbit characteristics were put back to Rex bucks for a second cross.

113. Thirty-one grade bucks and 29 grade does were sold during the year for breeding purposes.

Pasture and Fodder Crops.

114. Regular attention was paid to all pastures and the grazing was satisfactory.

115. The yields for the grass fields were quite good during the year due to favourable growing weather. Elephant Grass (*Pennisetum purpureum*) is the chief source of fodder and it continues to ratoon very well.

116. A second grass field was laid out as well as planted during the year and will be irrigated with urine by rewashings, &c. from the Dairy.

117. Only 5 acres of Uba Cane were reaped for fodder this year leaving 10 acres as standovers for 1945. This was due to good yields from the grass fields.

Dairy Feed for Distribution.

118. In conjunction with the Marketing Department (Food Controller) the Farm prepared approximately 1,000,000 lbs. of dairy feed for cows and goats from feeding stuffs supplied by the Marketing Department for distribution through their Depots.

Investigations.

119. Work was undertaken in conjunction with the Imperial College of Tropical Agriculture on the following :

(1) Poultry —Investigations on feed in relation to growth.
(2) Cattle—A calf experiment is in progress on the growth rate of dairy calves in the Tropics.
(3) Cattle—The effect of tick infestation on dairy cows.

120. The expenditure of the Farm amounted to $90,642.41 and the revenue to $60,869.30.

District Work.

Duties of District Staff.

121. The Senior Agricultural Officer, Agricultural Officers and the Agricultural Assistants were chiefly engaged on sugar cane and cacao subsidy inspections, and to a certain extent on food and rubber production. Other duties of the District Staff included inspection of school gardens, land settlement work, credit societies and the supervision of certain cacao fermentaries.

Land Settlements.

122. The Supervisor of Land Settlements, Mr. P. M. Hosten, reports as follows :—

123. *Acquisition of New Sites.*—The sum of $100,000 was provided for the working of land settlements and this was augmented by a supplementary vote of $37,500 for the acquisition of 244 acres in the County of Caroni. Of the total vote expenditure amounted to $128,244 leaving an unexpended balance of $9,256.

124. Three estates were acquired : 2 for the establishment of settlements in the Rio Claro area and 1 for resettlement of persons required to remove from the Irrigation Area of Caroni.

125. *Development.*—Most of the funds expended were in connection with road construction, drainage, extension of water supply and construction of buildings including a shop, office and pens for stock breeding unit at La Pastora.

126. *La Reconnaisance.*—Work at La Reconnaisance Settlement was mainly concerned with clearing, grading and laying down of cart roads.

127. *Other Settlements.*—The nature of the work carried out on other settlements was chiefly maintenance.

128. *Progress.*—Generally there has been steady progress in the agricultural development on resettlements. This has been due to

(*a*) Advice and instruction given to settlers and the laying down of demonstration plots to serve as a guide at the new settlements of Brooklyn and La Pastora.
(*b*) A steady demand and better prices obtained for all agricultural produce.

129. *Land Settlement Competitions.*—As in previous years Land Settlement Competitions were held and prizes distributed included livestock, poultry, plants and cash.

130. *Housing.*—The houses built by Government on Brooklyn and La Pastora Settlements were maintained in good order. No new houses were built by Government during the year. There has, however, been a greater number of houses constructed by the settlers themselves and in some cases the types have been a great improvement on those hitherto constructed.

131. Arrangements are under way for starting credit societies on some of these settlements. It is hoped that this will provide the impetus for the development of allotments.

Agricultural Credit Societies.

132. There were 94 agricultural credit societies operating during the year with a total membership of 3,283. Of these, 73 societies were financed by Government and 21 societies with a membership of 720 were financed by the Ste. Madeleine Sugar Co., Ltd. Ten new societies were registered during the year with a membership of 311.

133. A total of $131,132 was advanced to the Societies during the year. Of this amount $61,105 were advanced for cultivating canes ; $40,772 for ground provisions, $4,317 for other crops, $19,840 for livestock and $4,381 for repairs to houses. A total of 2,008 members received loans.

134. The repayments amounted to $133,096.55. At the end of the year outstanding loans amounted to $19,721.88.

Agricultural Co-operative Societies.

135. The Tobago Producers' Association in liquidation improved its financial position.

136. Nearly 12,800 barrels of lime were processed by the Tobago Lime Growers' Association and 7,448 lb. lime oil recovered.

137. The Co-operative Citrus Growers' Association handled 92,564 case of grapefruit and 2,067 cases of oranges. 77,793 cartons of canned juice were manufactured ; 9,420 cases were consumed locally and 63,856 exported, and the balance of 4,517 was carried forward to 1945.

138. The three Co-operative Cacao Fermentaries in Tobago continued operations during the year.

139. The Government Cacao Fermentary at Biche handled 6,665 lb. of wet cacao as against 11,640 during the previous year.

Experimental Work.

Sugar Agronomy.

140. The Acting Sugar Agronomist, Mr. F. M. Bain, reports that the work during 1944 was mainly concerned with field experiments with manures, with cultural and planting methods and with varieties. These experiments were originally laid down by Mr. P. E. Turner, the previous holder of the post of Sugar Agronomist.

Field Experiments in Operation.

141. Out of a total of 62 experiments to be reaped, twenty-four experiments remained unreaped in 1944, due to the shortage of labour, among them being twelve manurial trials.

142. Thirty-six varietal experiments and two cultural experiments were harvested on soil types which have been described.

143. The effects of the treatments or varieties on yield of cane and sugar and on crop quality will be recorded in detail in the *Annual Report for* 1944 *on Field Experiments on Sugar Cane in Trinidad*, published by the Sugar Cane Investigation Committee.

Cultural and Planting Methods.

144. An investigation into the effect of closer spacing of plants in the furrow showed that this had no effect on yield of plant cane or sugar.

145. In a trial at Esperanza Estate to test the effect of planting at the bottom of ridges against flat planting, ridging led to a gain of plant cane and sugar. The effect could not, however, be established as statistically significant.

Varieties.

146. There were twenty-six varieties under comparative test. The experiments revealed that, in addition to B.34104 and B.3337, which varieties are already planted on an extensive commercial scale, B. 37161, B.37172 and to a less extent B.37193, are worthy of being tried on a small scale in commercial plantings on all the soil groups of the Colony.

Cacao Agronomy.

147. The Acting Cacao Agronomist, Dr. B. G. Montserin reports as follows :—

River Estate.

148. Three experimental fields were maintained under cacao at River Estate. The I.C.S. variety trial in Field 7 was maintained by the Imperial College of Tropical Agriculture and yield records were taken by their research staff. The outstanding merit of the clones I.C.S. 8 and I.C.S. 1 was revealed. These clones yielded at the rate of over 700 lb. dry cacao at the age of 6 years. The clone I.C.S. 1 has been a consistently high yielder and shows intermediate resistance to Witches' Broom disease. This is the principal clone being propagated for cacao rehabilitation.

149. The labour situation improved somewhat and at the request of the Imperial College of Tropical Agriculture the Department resumed recordings of yield data in Field 19 where River Estate selections are laid out in a Latin Square experiment. In Field 20D where self-incompatible trees are being studied the recording of pods produced was also resumed.

150. The heavy incidence of Witches' Broom in fields adjacent to the experimental blocks made it necessary to fell most of the surrounding cacao in order to reduce the immediate source of infection. The felled areas were planted in food crops.

151. The cacao crop at River Estate amounted to 108½ bags of 165 lb. each which were sold to the Cocoa Planters' Association and realised $2,151.39.

Clonal Introductions from Peru.

152. These budded plants, representing 32 resistant clones, were introduced by Dr. Pound in February, 1943. They were kept under observation at the Plant Quarantine Station and released in February, 1944 when they were planted out at River Estate. All of the clones are represented among the plants which survived and cuttings have been taken for propagation at the La Pastora Station. These clones will be included in a lattice design experiment at Marper Estate for testing resistance to Witches' Broom disease.

153. Records were made of Witches' Broom incidence in the clones several of which have shown no infection, while on the others infection is negligible as compared with surrounding trees and seedlings.

Marper Estate.

154. Records of Witches' Broom infection were continued on trees under observation for resistance to the disease. Six of the local selections which have shown marked resistance are being propagated to provide material for the final tests.

155. Of the seedlings introduced from Ecuador and planted in 1938-39 some 40 clones are under observation for inclusion in the final trial. Many of the most resistant clones have been propagated by cuttings and nurseries of these are being established.

156. The site for laying out the experiment to test the resistant clones was cleared and thoroughly prepared. The necessary ground shade is now established and the field is ready to receive the plants.

157. A fair proportion of the cacao crop was reaped, 73 bags of 165 lb. being sold to the Cocoa Planters' Association for $1,578.22.

La Pastora Propagating Station.

158. The station started the year with 8 of the 45 units in operation. Due to conditions arising out of the war considerable difficulty was experienced in expanding the station during the first half of the year. Labour was scarce and unreliable, materials for completing the units were not available and transportation difficulties were encountered. The situation improved, however, during the second half of the year and expansion work was carried out so that at the close of the year 16 units were ready and 15 were actually in operation.

159. During the first half of the year rooting was far from satisfactory due probably to seasonal factors as well as to the poor quality of labour available. The various factors likely to affect rooting adversely have been under constant study, and there was an appreciable improvement towards the end of the year.

160. A total of 50,000 cuttings were rooted and hardened off successfully during 1944. Of these 17,000 were distributed to demonstration plots in various districts, 10,000 were used in extending nurseries for supplying cuttings and 23,000 are ready for distribution to applicants under the Cacao Rehabilitation Scheme.

161. The monthly output at December was 5,000 plants and provision is being made to step up production to 15,000 per month.

King's Bay Propagating Station.

162. The difficulties formerly encountered in shipping materials to Tobago for construction of the Propagating Station at King's Bay were finally overcome. The construction of quarters for the Officer-in-Charge, offices and store-room was completed in December while work on the propagators was due to commence in January.

163. The nursery of I.C.S. clones at King's Bay was extended by budding throughout the year. The existing nursery is in very good condition and the plants are capable of yielding sufficient cuttings for the immediate needs of Tobago.

Field Excursions.

164. By arrangements with the Agricultural Society of Trinidad and Tobago, field excursions were made to Marper Estate, La Pastora Propagating Station and River Estate where the Department's work on cacao was demonstrated.

Citrus Agronomy.

165. The Citrus Agronomist, Mr. F. M. Bain reports as follows :—

166. A detailed account of citrus experiments has already been submitted and is being published as a Bulletin of the Department.

167. The following are the main conclusions arrived at in this report :—

(1) That under the soil conditions existing in the experimental area it is essential to use both organic matter and artificial fertilisers to obtain good growth of citrus.

(2) When artificial fertilisers are used without organic matter the trees suffer from deficiencies of the minor elements within a few years.

(3) The effect of a balanced manurial treatment is to produce greater growth in the early years and much increased yields in the subsequent fruiting years.

(4) Rough Lemon has given the most vigorous growth as a stock for grapefruit and oranges.

(5) " Wild " Grapefruit has shown great variation as a stock. Some types are very vigorous and some give poor growth. The type of " Wild " Grapefruit used as a stock would appear to be important for both grapefruit and oranges.

(6) The types of Sweet Seville stock are fairly uniform and give results intermediate between those of Sour Seville and Rough Lemon.

(7) The types of Sour Seville are extremely uniform. The stock is quite compatible with both grapefruit and oranges as scions. The best yields of fruit have been obtained with this stock in the cases of Washington Navel orange and Marsh grapefruit.

(8) Sour Seville stock is more resistant to gummosis than Rough Lemon and " Wild " Grapefruit stocks.

(9) In the presence of a basal dressing of pen manure and a small application of phosphate, nitrogen gives significant increases in yield. Applications of potash have no additional effect.

(10) There is some indication that manurial treatment may have some effect on the rate of spread of gummosis within the tissues of the plant.

(11) There is some indication that the Duncan variety of grapefruit is less susceptible to gummosis than the Foster and Marsh varieties.

MISCELLANEOUS CROP INVESTIGATIONS.

168. The Senior Agricultural Officer, Dr. F. J. Pound, reports :—

169. *Hill Rice.*—Hill Rice was grown in Field 20A for the second consecutive season after felling the cacao but this time with the Immortelle trees felled. The yield was much lower than for the first crop, due to the tremendous invasion of corn grass which grew so rapidly it could not be held under control. There was practically no lodging of rice this year, due in part, no doubt, to the removal of the Immortelle shade and also to the working out of nitrogen from the soil.

170. Had it been possible to clear the field of all obstructions and plough the soil much of the invasion of corn grass would have been avoided. Further had weeding and hoeing machines been available the corn grass could have been disturbed before it had gained a hold. There is no doubt that some of the rice varieties yielded well—probably as well as swamp varieties—but the cost of production is definitely overwhelming without mechanical aid. All the seed from the best introduced varieties has been saved for resowing and distribution.

171. *Salt Tolerant Rice.*—It was unfortunate that the 1944 early rains came before work had been completed on a special plot which was being prepared for bulking and testing salt tolerant varieties of paddy. A number of varieties have now been grown successfully for five seasons in saline water. Each year a small quantity of surplus seed is given out to rice growers who have land liable to tidal influx, but they never save seed. If the experiment plot can be properly bunded in 1945 much larger quantities of salt tolerant grain can be distributed. Some of the varieties yield good crops but several varieties have been discarded as too low yielding to be of use. One variety is a very early maturing strain and we have difficulty in saving seed on account of bird attacks.

172. *Adlay.*—After a very promising start Adlay suffered a set-back on account of the difficulty experienced in hulling the grain by householders and although the common rice hullers were experimented with they caused undue breaking of the grain.

173. Several people in the country disticts continued to grow a few plants mainly for interest and with the recent acute shortage of chicken feed there has been a small revival of interest in Adlay as an ingredient in scratch grain mixture.

174. It is proposed to put down an acre under this crop and to explore further its preparation and use before making further efforts to extend the production of this grain by private growers. Trials are justifiable because Adlay is much heavier yielding in edible material per acre than either corn or hill rice and needs so little cultivation once it is established.

175. *Black-Eyed Peas.*—The Black-Eyed pea is one of the most popular legumes of its class in Trinidad and is largely grown as a catch crop in the lagoon areas after the rice crop has been reaped. In 1943 disastrous floods just prior to reaping destroyed practically the whole of the crop and Government decided to give assistance to the cultivators in 1944, by providing free seed and by giving a planting subsidy of $5 per acre. A total of ten tons of seed was obtained from the Food Controller and distributed. Germination was good and subsidy was applied for from 1,937 applicants on 1,878 acres. The Plant Protection Officers were taken from their normal districts and set to check the applications and this work took their time for around two months. Housing conditions and travelling facilities were extremely bad but the work was completed and paysheets prepared for $9,409. The crop grew well and practically all was successfully reaped before the 1944 rains were severe enough to cause floods.

176. *Corn.*—The high price—around $3.50 per barrel of 80 lb. wholesale—of corn maintained during the year encouraged still further felling of derelict cacao fields and although still scarce in Port-of-Spain there was more corn available in the country in 1944 than in 1943. A noticeable feature of the 1944 crop was the tremendous amount sold as "green" cobs for boiling, which disposal must have seriously reduced the amount of dry corn available for animal and chicken feed.

177. Yields in most places averaged about ½ ton per acre which is fair considering the primitive way in which this crop is grown. In July and August the heavy rains destroyed considerable areas of young germinating corn in St. George and St. Andrew.

178. Throughout the Colony complaints were received of damage done by vermin to the corn fields. Mosaic of corn was noticeable also in the Northern Counties.

Vegetables.

179. *Cauliflowers.*—Cauliflowers appeared on the market in quantity at only one period, Apri and May and then the market was glutted for a week or two. For the remainder of the year this vegetable has been scarce due to the lack of seed, few growers taking the trouble to propagate their plants from stem cuttings. On the La Pastora demonstration plot a few cauliflowers were planted each month but only in the April-May period did they give large heads—averaging over 2 lb. each, for the remainder of the year the heads were small. It appears that the Early Patna cauliflower is very sensitive to season and however well the plant is manured and watered it tends to premature flowering except at the close of the dry season and this is, of course, not desirable.

180. *Lettuce.*—The Mignonette variety continues to be a favourite for household growing but the tougher varieties such as "Boston" are preferred for market gardeners. It is becoming more obvious as each year progresses that more and more of the native people are eating lettuce either as a spinach or salad.

181. *Cabbage.*—Supplies of seed were very limited in 1943 and as a result there were fewer plantings of cabbage in the usual planting season of early 1944. Cultivators complained that the Government bulk purchased seeds were of a small heading choice table type and asked to be allowed to import the usual coarse field types now well proven for the Colony. A slight glut occurred in April which caused the price to drop from 20c. to 8c. per lb. An epidemic of bud root (*Bacterium carotovorus*) caused the rotting of considerable numbers of cabbage heads in the Aranguez district. The choice table types appear to be more susceptible to the disease than the field types.

182. *Tomatoes.*—This is a crop which now needs expert attention as the finer Marglobe types are failing in some of the usual tomato areas on account of root diseases and many growers unfortunately have turned back to planting the small local type. During recent years there have been rather discouraging losses in tomatoes and few cultivators now attempt to grow this fruit outside of the dry season and gluts occur. We really need a new tomato industry in which tomatoes are grown under weather proof roofs with regular treatment with fungicidal sprays and probably in sterilised soil. The local price of 12-16c. per lb. wholesale would seem to make this possible.

183. For several months towards the end of the year there were only negligible quantities of even poor tomatoes in the market due to the almost continuous rains of November and December which allowed the fusarium wilt to spread rapidly. A few growers whose plants came to harvest in October reaped a fair crop. A short glut occurred early in the year in the Debe-Oropouche lagoon area.

184. *String or Salad Beans.*—The pre-war encouraging increase in plantings of the choicer types of exotic salad beans such as Kentucky Wonder, &c. has diminished, and growers have gradually returned to the common types, bodi and field bush beans. To some extent this is due to the fact that it is difficult to save and store the Kentucky Wonder seed and poor seed, often heavily diseased gives but poor germination and growth.

185. *Water Cress.*—A special feature of the year has been the very large numbers of watercress beds constructed in the headwaters of the Santa Cruz River, particularly on the La Pastora Settlement. Provided these beds are kept in a sanitary condition and there is no outbreak of typhoid the growing of water cress is a most remunerative business.

Specialist Reports.

Plant Pathology.

186. The Plant Pathologist, Mr. C. A. Thorold, reports as follows :—

187. *Witches' Broom Disease of Cacao.*—There was no special control or experimental work on this disease in Trinidad. The campaign against Witches' Broom disease in Tobago was maintained. The cacao areas were searched by the Department's staff of inspectors, the brooms being removed from the trees by the Witches' Broom control gangs. A new area of infection was found at Parlatuvier, constituting the first definite occurrence of the disease on the north side of Tobago.

188. It was decided that the work of removing brooms in Tobago, at Government expense should cease at the end of 1944. Therefore no control gangs will be employed by the Department but the staff of inspectors is being maintained, and will give advice on the control of Witches' Broom disease, in combination with crop survey work and other duties.

189. *Virus Disease of Cacao.*—A virus disease of cacao was recognised in Trinidad by Mr. A. F. Posnette, Botanist in the Gold Coast Department of Agriculture whilst making cacao selections on behalf of that Government.

190. The disease has been transmitted to healthy cacao by budding, in this way two types of virus have been distinguished and are referred to as "Red Mottle Virus" and "Vein-Clearing Virus", respectively. These symptoms may occur together, or separately in certain places.

191. A survey of all the cacao areas of Trinidad and Tobago was undertaken by the Department of Agriculture, with the object of ascertaining the distribution of cacao virus disease in the Colony.

192. It now appears that virus disease symptoms, so far recognised, occur only in a limited area of the Northern Range of Trinidad, from Maracas Valley through Santa Cruz to Diego Martin. The search for virus disease in other areas is being maintained.

193. Field observations are being made with a view to determining the severity and rate of spread of the disease. It is possible that the virus has been present in Trinidad for a considerable time.

194. The disease does not not generally appear to be serious in its effect on the trees, therefore there is no immediate need for the application of control measures.

195. In co-operation with the Department of Agriculture, the cacao virus disease is being studied at the Imperial College of Tropical Agriculture, under Mr. R. E. D. Baker, Lecturer in Mycology.

196. *Black Rot Disease of Cabbages.*—Cabbages grown in the Aranguez district were apparently affected by *Pseudomonas campestris*, causing "Black Rot". It is likely that this disease was introduced on imported seed. There appeared to be varietal differences in susceptibility because "Premier Flat Dutch" was generally more severely attacked than the "Charleston" variety.

197. *Sugar Cane Mosaic.*—Routine inspections and rogueing of mosaic-infected stools have been continued.

198. *Rice Diseases.*—The "Brown Spot" disease (*Helminthosporium oryzae*) was prevalent, but not economically important. A condition in which there is abnormal and premature development of tillers was observed in a few localities. It appears that this disease may be similar to the malady known as "Man-Rice" in British Guiana. Attempts were made to isolate a pathogen, but no particular organism was consistently associated with this condition.

199. *Mushroom Cultures.*—Attention has been given to the possibility of mushroom (*Psalliota sp.*) cultivation in Trinidad. Cultures have been obtained through the generous assistance of Dr. J. W. Sinden of the Pennsylvania State College, U.S.A., Sporophore production under artificial conditions has not yet been achieved here, but experiments have been undertaken in an attempt to find suitable methods for growth and development of the fungus under tropical conditions.

200. A lecture on plant diseases and their control, was given to United States Agricultural students, engaged in Post garden operations, Trinidad Sector and Base Command.

201. The Plant Pathologist attended meetings of the Plant Quarantine Committee and undertook other duties in connection with the administration of the Plant Protection Regulations.

202. *Yeast.*—The writer attended the 1944 Sugar Technologists' Conference in Barbados and read a paper entitled "By-product Yeast for Stockfeed Purposes". This Conference provided opportunities for useful discussions and the acquisition of information which should be of value in furthering local development in the recovery and use of rum-yeast in Trinidad.

203. The writer was absent on vacation leave from 30th April to 29th August inclusive. During this period, an extensive tour was made in the U.S.A. and Canada where enquiries were made in regard to yeast production and use, on behalf of the Government of Trinidad and Tobago. A report on the writer's findings has been submitted and his recommendations are now being considered by the Government.

204. Grateful thanks are due to the Director and staff of the Imperial Mycological Institute for assistance in various ways.

Entomology.

205. The Entomologist, Mr. A. Pickles, reports that in the course of the year he was appointed a Member of the Sugar Cane Investigation Committee by His Excellency the Governor. He attended the annual meeting of the Advisory Committee of the British West Indies Central Sugar Cane Breeding Station in November-December as the representative of the Director of Agriculture. Immediately afterwards, he attended the Conference of British West Indies Sugar Technologists in the same capacity. In May and June he visited British Guiana at the request of the Government of that Colony to investigate an outbreak of froghoppers on sugar cane. Mr. L. P. Lange and Mr. P. H. Barran were appointed Plant Quarantine Officers during the year.

206. *Sugar Cane.*—Froghopper outbreaks were of limited severity and distribution. The total area of estate cane affected with blight did not exceed 1,050 acres and of this, only 62 acres were seriously injured.

207. The low incidence of froghoppers apparently related to abundance of green muscardine fungus which was plentiful in the affected fields before the second brood attained its height. Froghopper mortality from fungus attack was, indeed, so great and so rapid that field experiments on froghopper control were hardly possible.

208. An attempt was made, however, to test a new insecticide of vegetable origin for froghopper control. This product is known as "Sabadilla" and is stated to be produced from a Venezuelan plant. While assessment of the mortality produced by the insecticide in the field was most difficult owing to the high natural mortality strong indications were obtained that the product is highly toxic to adult froghoppers and that it has a high residual effect. This material is accordingly recommended for more critical trial as soon as opportunity occurs.

209. The Entomologist's visit to British Guiana noted above (para. 205) arose from an outbreak of froghopper, *Tomoaspis flavilatera*, on sugar cane at one East Coast estate, where about a thousand acres had already been affected at the time of his visit. This was the first record of a destructive outbreak of the insect on so large a scale, although this species has been recognised as a potential pest of sugar cane since about 1909. During his brief stay, he was able to show that the the eggs of the insect are laid principally in the soil around affected cane stools, that nymphs are attacked by a predacious Syrphid of the genus *Salpingogaster*, that Cyanogas dusting is not likely to be an effective control under the peculiar local conditions, that flooding affected fields with water produces a nymphal mortality of about 19 per cent. which can however, be increased to about 69 per cent. if fuel oil is added to the water. The absence of green muscardine fungus was most noticeable and material for artificial infection was subsequently supplied to the Department of Agriculture in British Guiana.

210. A summary of froghopper incidence on the Trinidad sugar estates since the commencement of detailed records in 1927 was commenced. This is intended to assist in the investigations of (*a*) the relation between weather conditions and severity of injury and (*b*) the relation of blight incidence and soil characters, especially with regard to the more recent soil surveys of the sugar cane areas.

211. *Food Crops.*—An experiment was conducted on the control of the Pineapple Caterpillar (*Thecla basilides*). Owing to great irregularity of flowering and fruiting of the crop, it was impossible to establish significant differences between the treatments applied, but a strong indication was obtained that dusting or spraying the inflorescence, as soon as it appeared, with lead arsenate was likely to prevent injury from this pest.

212. Cucumbers in Trinidad are severely attacked by the larvae of *Diaphania hyalinata* and, to a smaller extent, of *D. nitidalis*; an experiment was conducted to investigate the possibility of control by cultural measures. The experiment showed that weeded plots were much less freely attacked than unweeded ones and that plants allowed to trail over the ground were less subject to attack than plants supported on stakes. The differences in yields were highly significant on statistical analysis.

213. An experiment was laid down to test the possibility of controlling *Megastes grandalis* on sweet potato by treatment of the planting material and young plants. This experiment was still proceeding at the end of the year.

214. Control of lace-wing bug (*Corythaica monacha*) and flea beetle was attempted in a series of treatments arranged in a formal field experiment. Reaping of the crop was still in progress at the end of the year.

215. *Stored Products.*—Technical supervision of the St. Joseph Storage Depot was maintained. Locally produced corn was received in some quantity during October and was dried and put into store. The moisture content at the time of receipt varied between 12.4 and 25.4 per cent., the mean value being about 17.0 per cent. This was dried to a mean value of about 10.8 per cent. before being discharged into the storage tanks. Part of this material was found in December to be affected with grain weevils and was fumigated with Cynogas during transfer to a clean tank. Examination of samples subsequently indicated that the fumigation treatment had been effective.

216. Chemical examination of red beans, experimentally fumigated with Cyanogas six months previously, showed that about 20 parts per million of HCN remained in the fumigated material. This is well within the limits of safety for food purposes and the observations show that fumigated pulses are perfectly wholesome for human or animal consumption.

217. *Cacao.*—Cacao plantations and neighbouring food gardens have suffered greatly from the attacks of vermin, especially of rats, squirrels and parrots. The difficulty of control of these pests has been magnified by scarcity of shotgun ammunition and the difficulty of ensuring that the agricultural community receive a share of such supplies as are available. In the absence of any concerted control measures, a serious situation has arisen and the cacao crop is likely to be severely reduced from this cause.

218. *General Notes on Pest Incidence.*—The following pests have been recorded during the year. Cacao Thrips (*Selenothrips rubroscinctus*) on Avocado; Banana Weevil (*Cosmopolites sordidus*) on bananas and plantains; various *Chrysomelidae* defoliating peas and beans and *Lepidopterous* and *Coleopterous* larvae boring in pods of pigeon peas; mole crickets (*Scapteriscus vicinus*), aphides (*Brevicoryne brassicae*) and cabbage worm (*Hellula phidilealis*) attacking cabbages and cauliflowers; Cassava Midge (*Lonchae* sp.) attacking terminal shoots of cassava; miscellaneous army worms and cut worms causing slight damage to maize; the Long-corn bettle *Trachyderes succincta* and *Aphis maidis* also attacking this crop; cucumbers were almost universally attacked to varying degrees by larvae of *Diaphania hyalinata* and *D. nitidalis*; citrus was attacked by the scale insects *Lepidosaphes gloveri*, *L. beckii*, *Prontaspis citri*, *Salenaspidus articulatus*, *Chrysomphalus ficus*, *Pulvinaria pyriformis*, *Ceroplastes floridensis* and *Orthezia praelonga*; *Papilio anchisiades* ("Orange Dog") was also destructive on this host; on Melongene, *Corythaica monacha* and *Epitrix* sp. were generally destructive and the Membracid *Antianthe expansa* was also recorded; Ochro was attacked by the cacao beetle *Steirastoma depressum* and, on one occasion, was injured by a complex of *Chrysomelid* beetles, accompanied by symptoms resembling a mosaic disease.

Soil Survey.

219. The Soil Chemist, Dr. E. M. Chenery, reports as follows:—

220. In co-operation with the Land Settlement Officer possible sites for Settlements within the Sugar Cane belt were examined at Carolina, Garth, Pluck, Inverness, Brothers' Road and Cunupia.

221. Reports on the soils of Santa Emelia Estate, Rio Claro and Los Angeles Estate, Moruga were also made for the Land Settlement Supervisor.

222. A detailed Soil Survey of the Siparia Reserve was made in order to throw some light on the irregular teak stands in that Forest Reserve. The main finding was that exposure to drying winds was more likely to be the cause of the poor patches of teak rather than definite soil factors.

223. An examination of water tables at the Centeno Estate was undertaken after the unprecendented heavy rains of May and June. It was found that perched water tables in cultivated land were 6-8 feet and lower, below the surface, while those of the terrace land in the site proposed for the Farm School were well below 14 feet. Temporary perched water tables were found in other parts of the detrital terrace lands at or near the surface.

224. A critical investigation of the latest methods of soil analysis was made in the laboratory. A method of analysis for potash in soils was evolved which is a marked improvement on existing methods both as regards accuracy and saving of time.

225. The Soil Chemist was absent on long leave in the U.S.A. and Canada from 30th July to 11th November.

Veterinary.

226. The Senior Veterinary Officer, Captain H. V. M. Metivier, reports and follows :—

227. *Anthrax.*—A sporadic case occurred in a bovine on Prospect Estate, Tobago and the incontact animals were all inoculated.

228. *Swine Fever.*—During the first six months of the year the incidence of Swine Fever had fallen considerably in Trinidad and there were no major outbreaks, just small foci of infection, but during the latter part of the year there were several cases in the Mayaro district. The disease was difficult to control as the peasantry keep their pigs loose and, further, vultures are numerous in this district and carry infection around. The disease also broke out in Tobago in the middle of the year with cases occurring at Patience and Siparia Hills, Canaan Village, Sherwood Park and the Government Stock Farm. The disease was again controlled by the "Slaughter" policy and during the year a total of 191 pigs was destroyed and $1,947 paid in compensation.

229. The Department again prepared posters which were displayed in prominent places in Tobago and Trinidad.

230. Quarantine restrictions against St. Lucia and Carriacou (Windward Islands) were revoked during the year.

231. *Paralytic Rabies (bat-transmitted).*—Cases of this disease occurred this year in the Counties of St. Andrew (Sangre Grande) and Caroni (Longdenville) during the month of March. In the Longdenville area the disease spread in a southerly direction and there were 36 cases reported in the Longdenville-Caparo area at the end of June. No cases occurred southwest of this area until the end of July when 30 cases were recorded in the Freeport district. The disease occurred chiefly in bovines and can be summarised as follows :—

County.	*District.*	*No. of Cases.*	*Period.*
St. Andrew ...	Sangre Grande	7	March
Caroni ...	Longdenville-Caparo	36	March-June
Caroni ...	Freeport	30	June-July

232. As soon as cases occurred steps were taken by the Health Department to station Bat Units in the affected districts where bat-biting was prevalent and this Department immediately imported 2,500 doses of Anti-Rabies Vaccine from Venezuela and carried out vaccination work in and around the affected districts.

233. No further cases were reported during the period August-December.

234. *Rabies (Ordinary).*—Five dogs were quarantined during the year on arrival in the Colony. Three hundred and ninety stray dogs were caught by the Police Department during the year; 206 were destroyed and 184 claimed.

235. *Foot and Mouth Disease.*—The restrictions on the importation of cloven footed animals from British Guiana still remained in force, but no further cases ocurred in that Colony.

236. *Tuberculosis.*—The dairy cattle in the rural districts around Port-of-Spain, including those in the larger dairies—about 1,500 head—were tested during the year and there were three reactors. The cows in the City were also tested and in some of the dairies in country districts, but no reactors were reported. At the Abattoir only two cases were notified.

237. *Cow Pox.*—This condition cleared up entirely during the year in cattle, but a few cases were seen in goats, the infection spreading from human beings who had been vaccinated.

238. *Equine Encephalomyelitis.*—This disease which flared up in the Oropouche Lagoon district (County of St. Patrick) in October, 1943, was brought under control during the month of March. A few cases occurred as far north as the San Fernando area and it also spread eastwards to Princes Town; to the south cases were seen as far south as Cedros. There were 63 cases in January, 39 in February and three in March. Vaccination of equines in all the counties of Trinidad was carried out twice during the year, as the protection afforded by inoculation is for 6 months duration. This work was carried out at suitable centres with the help of the district staff. The vaccine (Venezuelan strain) was obtained from the Venezuelan Government through the Consul General in this Colony and Major R. T. Gilyard, Sector Veterinarian of the U. S. Army stationed in Trinidad, gave considerable help again in the vaccination work as well as in the laboratory investigations.

239. The total number of cases since the outbreak in October, 1943, was 377 of which 314 died and 63 recovered :—

	Died.	*Recovered.*
Horses	63	18
Mules	36	25
Donkeys	215	20
	314	63

240. It was definitely proved that the common equine mosquito feeder in the area—*Mansonia titillans complex*—was the chief transmitter though other mosquitoes and blood-sucking insects might also be responsible for spreading the infection.

241. The restrictions placed on the importation of equines from Venezuela were revoked during the year and these animals were permitted to be landed in the Colony provided they were accompanied by certificates of vaccination assigned by a Government Veterinary Officer.

Non-Proclaimed Diseases.

242. *Internal Parasites.*—The rainfall was fairly high and internal parasites were responsible for a good deal of trouble in young stock. Phenothiazine continues to give good results especially in horsekind ; copper sulphate or copper and nicotine sulphates have also been used in sheep, goats and cattle with satisfactory results. As soon as sufficient quantities of Phenothiazine are available its use will be compared with the copper sulphate treatment in ruminants.

243. *Tetanus.*—Very few cases were reported.

244. *Ulcerated Lymphangitis.*—This disease has practically disappeared from the Colony.

245. *Pneumonia in Calves.*—Cases were again reported during the year in some of the large dairies but the cause has, in some cases, been traced to overcrowding and unhygienic conditions. Sulpha drugs are giving satisfactory results.

246. *Brucellosis in Cattle (Contagious Abortion).*—The incidence of the disease has dropped in most of the large dairies, in which alone it is known to occur, but this may be due to the fact that no new stock have been introduced. The stabling of all cows permanently three weeks before calving and the isolation of an infected cow for 2-3 weeks after calving prematurely has, however, helped to control the condition in the large dairies.

247. *Strangles and Influenza.*—Following the importation of some mules from the Southern States (U.S.A.) a few cases especially of strangles occurred on some of the sugar plantations.

Inspection of Animals.

248. Animals imported into the Colony which were inspected as usual comprised the following :—

Horses	...	...	31	Sheep			2,930
Mules	...	...	152	Pigs	...	...	481
Donkeys	...	...	18	Goats	...	...	10,921
Cattle	...	...	18,504	Dogs	...	...	5

249. There was a marked increase in the number of goats—imported chiefly for food—and of the total of 10,921, 9,853 were imported from the Mainland of Venezuela.

Quarantine Station.

250. The number of animals admitted to the Quarantine Station was as follows :—Cattle 18,077 ; horses 3 ; mules 37 ; asses 10 ; 19 steers died from injuries and 12 were slaughtered (emergency) on landing.

Imperial College of Tropical Agriculture.

251. The Department continues to be greatly indebted to the Principal of the Imperial College of Tropical Agriculture, Mr. O. T. Faulkner, C.M.G., and his staff for much assistance.

Publications.

A New Rice Industry (Proceedings of the Agricultural Society, 44, Part I, p. 55)—Dr. F. J. Pound.

An Exciting Race (Proceedings of the Agricultural Society, 44, Part I, p. 65)—Dr. F. J. Pound,

The Mechanisation of Agricultural Practices on Sugar Estates (Proceedings of the Agricultural Society, 44, Part II, pp. 111-119)—Dr. F. J. Pound.

Government's Scheme for Cacao Rehabilitation (Proceedings of the Agricultural Society, 44. Part III, pp. 183-190)—Dr. F. J. Pound.

Can You Plant a Cacao Tree ? (Proceedings of the Agricultural Society, 44, Part IV, pp. 239-241) —Dr. F. J. Pound.

Can We Select an Area and Give the Children a Hobby ? (Proceedings of the Agricultural Society, 44, Part IV, pp. 243-245)—Dr. F. J. Pound.

A Brief Account of the Results of the Citrus Experiments at St. Augustine Station (Proceedings of the Agricultural Society, 44, Part IV, pp. 255-276)—F. M. Bain.

Field Experiments on Sugar Cane in Trinidad. Annual Report for 1944. (Sugar Cane Investigation Committee)—F. M. Bain.

List of Experiments in Operation on Sugar Cane in Trinidad in 1944. (Sugar Cane Investigation Committee)—F. M. Bain.

Equine Encephalomyelitis Sleeping Sickness (Agricultural Society Paper No. 848, 1944)—Capt. H. V. M. Metivier, O.B.E.

	Date.	References.	Remarks.
		Agriculture.	
Sugar Quotas Order, 1944	25. 1.44	Sugar Quotas Ordinance, Ch. 23. No. 13...	Allocation of Quotas 1st February, 1944 to 31st January, 1945.
Sugar Quotas Amendment Order, 1944	11. 1.44	Sugar Quotas Order, 1943	Additional quota of 353.6 tons to Caroni, Ltd.
Sugar Quotas Ordinance	13.12.44	Sugar Quotas Order, 1944	Approval for the sale and delivery of remaining 10 per cent. of the quota allotted to each manufacturer for consumption within the Colony.
Production of Cane and Sugar Ordinance, 1944 ...	27. 4.44	The Production of Cane and Sugar Ordinance, 1944 No. 9 of 1944	This Ordinance makes provision for the payment of a minimum price of $5.50 per ton for cane and provides also for the payment to manufacturers for replacements in their factories up to a total sum of $400,000 and also a further sum of $400,000 by way of interest on capital. The provisions of earlier laws are re-enacted.
Order No. 467 Production of Cane and Sugar (Requisition of Returns)	15. 8.44	The Production of Cane and Sugar Ordinance, 1944, No. 9 of 1944	Returns to be submitted to the Financial Secretary.
Order No. 221	5. 5.44	Production of Cane and Sugar Ordinance, No. 9 of 1944, Section 9 (4)	Ste. Madeleine Sugar Co., Ltd. and Craignish Estate, Ltd. to pay certain farmers for canes delivered under contract with Hindustan Estate 25 cents per ton mile for excess mileage.
Cocoa Subsidy	3. 5.44	Cocoa Industry Ordinance, Ch. 23. No. 22 (Section 3) ...	Variations to the Scheme submitted in Council Paper No. 61 of 1944—Acting Governor in Council.
Cocoa Relief (Amendment) Regulations, 1944 ...	2. 6.44	Cocoa Industry Relief Ordinance, Ch. 23. No. 19 (Section 31).	Extending period for making advance for one year from date of expiry.
		Veterinary.	
Dogs Amendment Regulations, 1943	6. 1.44	Dogs Ordinance	Amendments to Regulations 9, 11 and 15 in terms of substituting certain changes.
Order No. 56—Infected Area	3. 2.44	Diseases of Animals Ordinance under Section 6 (6) ...	Declaring Government Stock Farm, County St. George, to cease being an infected area.
Order No. 57—Infected Area	3. 2.44	Do. do. do.	Declaring Petit Morne Estate County Victoria, to cease being an infected area,
Order No. 58—Infected Area	3. 2.44	Diseases of Animals Ordinance under Section 6 (5) ...	Declaring lands of Hilda de Montbrun an infected area owing to the existence of Cow Pox.
Importation of Swine Regulation, 1944	15. 2.44	Diseases of Animals Ordinance, Ch. 25. No. 2, Section 13 ...	Prohibition of importation or landing of swine or carcases of swine from Montserrat owing to the prevalence of Swine Fever.
Order No. 124—Infected Area	13. 3.44	Diseases of Animals Ordinance, Ch. 25. No. 2, Section 6 (6)...	Declaring lands of Hilda de Montbrun to cease being an infected area.
Order No. 143—Infected Area	20. 3.44	Diseases of Animals Ordinance, Ch. 25. No. 2, Section 6 (5)...	Declaring Prospect Village in the Island of Tobago an infected area owing to the existence of Anthrax.
Prohibition of Importation of Horses, Mules and Asses from Venezuela (Amendment) Regulations, 1944	18. 4.44	Diseases of Animals Ordinance, Section 13.	Importation permitted under certain conditions.
Imdortation of Swine (Grenada) Regulations, 1944	13. 6.44	Diseases of Animals Ordinance, Ch. 25. No. 2	Prohibition of importation or landing of swine or carcases of swine from Grenada owing to the prevalence of Swine Fever.
Order declaring certain lands no longer an Infected Area	15. 6.44	Diseases of Animals Ordinance, Ch. 25. No. 2, Section 6 (5)	Revoking Order made on 20th March, 1944.
Order No. 315—Infected Area	24. 6.44	Diseases of Animals Ordinance, Ch. 25. No. 2, Section 5 (1)	Declaring Island of Tobago an infected area owing to the existence of Swine Fever.

16th May, 1945.

H. V. M. METIVIER,
for Director of Agriculture.